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(21)Application number : **07-324546** (71)Applicant : **TOSHIBA CORP**

(22)Date of filing : **13.12.1995** (72)Inventor : **SAKAMOTO NORIYA**

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**(54) MULTIPLEX BROADCASTING SYSTEM AND BROADCASTING  
TRANSMISSION DEVICE/BROADCASTING RECEPTION DEVICE USED IN  
THE SAME**

(57)Abstract:

PROBLEM TO BE SOLVED: To easily speedily and precisely select/designate a program when the other program related to the program which is viewed at present is to be viewed by changing the program which is reproduced/outputted when the change request of the program based on indicated link information is inputted by means of a viewer.

SOLUTION: In the device of a broadcasting station information on the other related programs are set as link information for the respective programs link information is multiplexed with the program and it is broadcasted. In the device of

a reception-side the title of a link destination is superimposed on the video signal of the program which is viewed at present based on link information which is set on the program while the program that the user designates is reproduced and outputted so as to display it on a monitor 37. When the user designates the title of the program by using a remote controller 42 in such a state the designated program is received instead of the program which is viewed till then or in addition to the program which is viewed till then so as to reproduce and output it.

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## CLAIMS

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### [Claim(s)]

[Claim 1] In a multiplex broadcast system which chooses and carries out the reproducing output of the desired program out of two or more programs by which carry out multiplex [ of two or more programs ] broadcast them at the transmitting side receive a multiplex-broadcasting signal sent from said transmitting side by a receiver and multiplex is carried out to this broadcasting signal Said transmitting side generates link information which expresses correspondence relation between the program concerned and other programs which have predetermined relevance to the program about each of two or more of said programs Carry out multiplex [ of this link information ] to said two or more program transmit and said receiver While choosing and carrying out the reproducing output of the desired program out of two or more programs by which multiplex is carried out to a multiplex-broadcasting signal sent from said transmitting side Reproduce selectively link information corresponding to the selected program concerned and a televiewer is shown A multiplex broadcast system changing a program which carries out a reproducing output based on link information under this change request and said presentation when a change request of a program based on this shown link information is inputted by televiewer.

[Claim 2] When carrying out multiplex [ of two or more programs ] and broadcasting them using several broadcast channels with which frequency

differs respectively the transmitting side transmits to link information of each program including information to express and a broadcasting channel of a program of the link destination a receiver. The multiplex broadcast system according to claim 1 performing a reception change of a broadcasting channel based on information showing a broadcasting channel contained in link information when a change request to a program of other broadcasting channels is inputted.

[Claim 3] Information as which the transmitting side expresses other programs which become the link information of each program with a link destination of the program concerned. Transmit including information to express respectively and data which an information supplying source connected to a computer network provides a receiver. When a change request to data of an information supplying source connected to said computer network is inputted by televiewer based on link information sent from the transmitting side. The multiplex broadcast system according to claim 1 accessing to an information supplying source of said computer network receiving applicable data based on this change request and link information and outputting these received data.

[Claim 4] The transmitting side transmits to link information including title information showing a program of a link destination and a receiver. The multiplex broadcast system according to claim 1 or 2 inserting in an image of a program on display title information showing a program of a link destination included in link information sent from the transmitting side and displaying it.

[Claim 5] Title information as which the transmitting side expresses a program of a link destination to link information. Transmit including title information to express and data which an information supplying source connected to a computer network of a link destination provides a receiver. Title information showing a program of a link destination included in link information sent from the transmitting side. The multiplex broadcast system according to claim 3 changing a display style mutually and displaying title information showing data which an information supplying source connected to a computer network of a link

destination provides.

[Claim 6] A broadcast sending set used with a multiplex broadcast system which chooses and carries out the reproducing output of the desired program out of two or more programs characterized by comprising the following by which carry out multiplex [ of two or more programs ] broadcast them at the transmitting side receive a broadcasting signal sent from said transmitting side by a receiver and multiplex is carried out to this broadcasting signal.

A means to generate link information which expresses correspondence relation between the program concerned and other programs which have predetermined relevance to the program about each of two or more programs.

A means to carry out multiplex [ of the link information generated by this means ] to said two or more programs and to transmit.

[Claim 7] A broadcast receiving set used by a system which chooses and carries out the reproducing output of the desired program out of two or more programs characterized by comprising the following by which carry out multiplex [ of two or more programs ] broadcast them at the transmitting side receive a broadcasting signal sent from said transmitting side by a receiver and multiplex is carried out to this broadcasting signal.

A link information presenting means for reproducing selectively link information corresponding to the selected program concerned and showing a televiewer while choosing and carrying out the reproducing output of the desired program out of two or more programs by which multiplex is carried out to a broadcasting signal sent from said transmitting side.

A change-request input means for a televiewer to input a change request of a program based on link information shown by this link information presenting means.

A reproduction program alteration means which changes a program which carries out a reproducing output based on link information under this inputted change request and said presentation when a change request is inputted by this

change-request input means.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the broadcasting system using communications networks such as a radio terrestrial wave, a broadcasting satellite or a communications satellite, a CATV network and a computer network. Especially at the transmitting side, a multiplex [ of two or more programs ] is carried out, they are broadcast, and it is related with the broadcast sending set and broadcast receiving set which are used by the multiplex broadcast system which chooses and carries out the reproducing output of the desired program out of two or more programs by which receive the broadcasting signal sent from the transmitting side by the receiver, and multiplex is carried out to this broadcasting signal, and this system.

[0002]

[Description of the Prior Art] In recent years, the art which digitizes and carries out signal processing of the variety-of-information signals such as an image and a sound progresses splendidly, and development of the new broadcasting system which united a digital broadcasting system and digital broadcasting and digital communications is briskly performed in every country in the world in connection with this.

[0003] By the way, in developing such a digital broadcasting system, the art which carries out compression processing of the information data etc. of the digitized video signal, an audio signal, and others as one of the elements which become the most important is mentioned. As a standard of this data compression processing art, MPEG (Moving Picture Image Coding Experts Group), Although JPEG (Joint Photographic Coding Experts Group), H.261 etc. are in use, These days, they are

ISO(International Organization for Standardization) /IEC(International Electrotechnical Commission) 13818[ISO/IEC JTC(Joint Technical Committee) 1/SC (Subcommittee)29/WG (Working.). The method proposed by Group11] is examined.

[0004]By the broadcasting station side this ISO/IEC13818 not only prescribes the data compression system mentioned abovebut. For every digital images which constitute a programvoice dataand other information datamultiplex [ of the bit stream which performed compression processingrespectively ] was carried outit was broadcastand the method is hardened also about the control section for a digital broadcasting system with which a desired program is referred to as receiving selectively by a receiver end.

[0005]Drawing 16 shows an example of the signal format of the bit stream for broadcast and communication specified to ISO/IEC 13818-1. In the figurepicture image data and voice data make a frame structurerespectively. One frame of picture image data and voice data is what added the header to the packet data called PES (Packetized ElementaryStream). PES is variable length. On the other handinformation data makes section form. One section of information data is what added the header to the information data divided into the length defined beforehand. And one section of one frame each and information data of the above-mentioned picture image data and voice dataAfter being divided every 184 bytesrespectivelyby adding 4 bytes of headerit becomes 188 bytes of packet called TS (Transport Stream)Time Division Multiplexing of these packets is carried out in the given orderand one bit stream is generated.

[0006]Although drawing 16 showed the case where multiplex [ of picture image datavoice dataand every one information data ] was carried outrespectivelyWhen [ actual for example] carrying out Time Division Multiplexing of two or more picture image data like multi-angle broadcaster when carrying out Time Division Multiplexing of two or more more information data when carrying out Time Division Multiplexing of two or more voice data like multilingual broadcastthe variation of various sorts can be considered.

[0007]Next drawing 17 shows an example of the composition for generating the bit stream for broadcast at the transmitting side. Namely respectively in [ the programs P1-Pn show one program respectively and ] the multiplexing circuits 111-11n these programs P1-Pn It is generated by carrying out Time Division Multiplexing of two picture image data two voice data and other one information data and one PMT (Program Map Table). The description about PID (Packet Identify) for identifying picture image data voice data and information data and a program etc. are put on PMT.

[0008]As for the programs P1-Pn of n system generated in this way Time Division Multiplexing of each data is carried out by the multiplexing circuit 12. In this case PAT (Program Association Table) as synthetic program information for extracting PMT of each program in the multiplexing circuit 12 Time Division Multiplexing also of the NIT (Network Information Table) which shows CAT (Conditional Access Table) for controlling scramble the information on the network currently used etc. is carried out.

[0009]Thus according to the system which applied the standard of ISO/IEC 13818-1 PMT PAT CAT and four kinds of tables that become in NIT are set up about program information. PAT is [ "00" and CAT of PID of these tables ] "01" and PMT and NIT are to be specified freely.

[0010]Therefore in a receiver in order to specify the program to which it views and listens as shown in drawing 18 PAT is decoded first and PID of PMT which detected and detected PID of each PMT is specified. Then by detecting each PID of program addition data such as picture image data of the specified program voice data and information data and specifying PID which should be decoded various kinds of data can be decoded and it can reproduce.

[0011]

[Problem(s) to be Solved by the Invention] However the following technical problems are left behind to the above systems.

(1) A user does not understand [ what kind of program is broadcast by other broadcasting channels and ] only by decoding PAT which manages one

broadcasting channel (stream sent by the same frequency carrier). In order to get to know this the user needs to tune in other broadcasting channels needs to receive that broadcasting signal and needs to display a program list by decoding PAT contained in this broadcasting signal.

[0012] (2 In order to get to know the contents of programs other than the program which a user is choosing in one broadcasting channel it is necessary to detect PID of PMT which shows the contents of other programs described by PAT and to decode this PMT.) For this reason the user has to choose selection of a program to watch based on the race card made from PAT.

[0013] The place which this invention was made paying attention to the above-mentioned situation and is made into that purpose it is in easy and providing the multiplex broadcast system which enables it to carry out promptly and accurately and can aim at improvement in a user's program selection operativity by this its broadcast sending set and a broadcast receiving set about the selected designation of the program in the case of trying listening other programs relevant to the program under viewing and listening.

[0014]

[Means for Solving the Problem] To achieve the above objects in [ in the transmitting side this invention carries out multiplex / of the link information showing the program concerned and other programs which have predetermined relevance / to two or more above-mentioned programs transmits about each of two or more programs and ] a receiver When choosing and carrying out the reproducing output of the desired program out of two or more programs by which multiplex is carried out to a broadcasting signal sent from the above-mentioned transmitting side Make receiving selection of the above-mentioned link information created about the selected program concerned and a televiewer is shown When a change request of a program based on this shown link information is inputted by televiewer a program which carries out a reproducing output is changed based on link information under this change request and above-mentioned presentation.



[0015]Therefore according to this invention by a receiver link information which has this program and predetermined relevance during viewing and listening of arbitrary programs combines for example it is displayed. For this reason when a user wants to view and listen to a program under viewing and listening and other programs which have relevance it becomes possible to view and listen to a desired program by performing program specification based on link information currently displayed. Repeat change operation of a reception channel operation of looking for a desired program from a decoded result of PAT etc. by trial and error and it becomes unnecessary for this reason to perform them. Becoming [ to reproduce a desired program simply appropriately moreover in a short time as a result ] possible operativity concerning a user's program selection improves substantially.

[0016]

[Embodiment of the Invention] Hereafter two or more embodiments of this invention are described with reference to drawings. These embodiments explain the system according to ISO/IEC 13818-1 to an example.

[0017] (A 1st embodiment) Drawing 1 is a circuit block figure showing the composition of the data multiplexing circuit of the broadcast sending set used with the multiplex broadcast system concerning this 1st embodiment. Multiplex [ of two picture image data, two voice data and the one information data ] is carried out and this circuit explains them as one thing which carries out organization channel (program) composition.

[0018] Picture image data is inputted into the input terminal 201, 202 respectively and voice data is inputted into the input terminal 203, 204 respectively and the information data as attached data is further inputted into the input terminal 205.

[0019] As for the picture image data inputted into the terminal 201, 202 compression encoding processing is performed by the video encoder 211, 212 respectively and the variable rate output is buffered by FIFO memory 221, 222. Picture image data outputted with the fixed rate from FIFO memory

201202 is packet-ized in the packet-ized circuit 231232respectivelyand is inputted into the memory 241242.

[0020]About the voice data inputted into the input terminal 203204system processing is carried out in the voice encoder 213214FIFO memory 223224and the packet-ized circuit 233234this becomes a packetized voice similarlyand it is stored in the memory 243244. After the information data inputted into the input terminal 205 is packet-ized in the packet-ized circuit 235it is stored in the memory 245.

[0021]The packet multiplexing controller 25supervising the data volume stored in each above-mentioned memories 241-245. The read-out timing of dataetc. are controlled so that each memory does not cause overflow or an underflowand it outputs to the program multiplexing circuit which carries out Time Division Multiplexing of the data of each memories 241-245and does not illustrate it by this.

[0022]The PMT outputting part 26 holds the program map table corresponding to a program. The link information outputting part 27 holds the link information table corresponding to each program. And the data of a program map table and the data of a link information table which were held at these PMT outputting parts 26 and the link information outputting part 27it is read by read-out control of the above-mentioned packet multiplexing controller 25 at intervals of about 1 lawand Time Division Multiplexing is carried out to each above-mentioned picture image data and voice data.

[0023]By the wayinto an identical programthe above-mentioned link information table changes according to the time progress further for every programand the contents have the following variationsfor example.

[0024](1) In forming the link which does not ask a genre probablyit generates and sends out the link information table which does not ask a genre according to each program. For examplethe program of a lesson is received as shown in drawing 4The program of golftennisand TOP is made to linkand the title of the program of these link destinationsbroadcasting channel frequencyPID of picture

image dataPID of voice dataPID of information dataand PID of link information constitute link information.

[0025](2) In forming the link to a sports programThe title of the database which has updated the progress of the game currently held at the other halls of the genre one by oneits broadcasting channel frequencyPID of picture image dataPID of voice dataPID of information dataand PID of link information are included in link information. The title holding informationincluding the profile etc. of the player who is participating in the gameof a databaseits broadcasting channel frequencyPID of picture image dataPID of voice dataPID of information dataand PID of link information may be included in link information. The title of a program which is relaying the game at the other hallsits broadcasting channel frequencyPID of picture image dataPID of voice dataPID of information dataand PID of link information may be included in link information.

[0026](3) In forming the link to news or a documentary programThe title of a program which explains the contents of the news or the documentary program in more detailits broadcasting channel frequencyPID of picture image dataPID of voice dataPID of information dataand PID of link information are included in link information.

[0027](4) In forming the link to a drama programIn order to use multi-endingthe title of other sub programs currently broadcast simultaneouslyits broadcasting channel frequencyPID of picture image dataPID of voice dataPID of information dataand PID of link information are included in link information.

[0028](5) Also when the program of what kind of genre is being broadcastmake the program of emergency broadcast linkand include the titleits broadcasting channel frequencyPID of picture image dataPID of voice dataPID of information dataand PID of link information in link information.

[0029]The icon which shows the contents of information other than a titlebroadcasting channel frequencyand PID of each datathe information which specifies the display position on the display screen of an icon and the display font of a titleetc. may be added to the link information generated by above-mentioned

(1) - (5).

[0030] On the other hand drawing 2 is a circuit block figure showing the composition of the broadcast receiving set used with the multiplex broadcast system concerning this embodiment. The multiplex-broadcasting signal broadcast from the broadcast sending set is inputted into the tuner 32 after being received by the antenna 31. Recovery processing and error correction decoding processing are performed here and serves as a packet-ized bit stream and is outputted. In the broadcasting signal of several broadcasting channels from which frequency differs by the synthesizer which is not illustrated selectively the tuner 32 is constituted so that a reception recovery is possible. In this case as a kind of receivable broadcasting signal not only a terrestrial wave but the thing relayed and sent with a broadcasting satellite or a communications satellite is contained.

[0031] The packet-ized bit stream outputted from the tuner 32 is inputted into the depacketizing controller 39, FIFO memory 33, 332 and SUTATIKU type RAM (SRAM) 333 and the program table memory (PAT memory) 334 respectively. Among these the depacketizing controller 39 performs memory control so that the packet of PAT (packet ID= "0") may be first incorporated into the PAT memory 334. The data incorporated into the PAT memory 334 is analyzed by the control section 40 which has CISCRISC or DSP. That is, packet ID of PMT of each organization channel described in PAT is detected.

[0032] On the other hand packet ID of the organization channel specified by a televiewer is beforehand stored in the memory 43. Storing of packet ID of this organization channel is performed by analyzing the operation information inputted by operation of the remote control 42 with the microcomputer 41 and checking packet ID of a specification organization channel.

[0033] The control section 40 directs each ID of a video packet and a packetized voice indicated to PMT of the program specified by a televiewer for the depacketizing controller 39 according to packet ID of the specification organization channel stored in the above-mentioned memory 43. According to

these directions the depacketizing controller 39 extracts a video packet and a packetized voice applicable out of the packet-ized bit stream outputted from the tuner 32 respectively and writes them in FIFO memory 331332. The video packet and packetized voice which were written in this FIFO memory 331332 are read synchronizing with the synchronized signal which is not illustrated respectively and are inputted into the video decoder 341 and the audio decoder 342. In these decoders 341342 decoding of the above-mentioned video packet and a packetized voice is performed respectively.

[0034] And after the picture image data outputted from the video decoder 341 is changed into an analog video signal by the digital to analog converter (D/A) 35 it is supplied and displayed on the monitor 37 through the screen synthetic circuit 36. The audio signal outputted from the audio decoder 342 is supplied to the loudspeaker 38 and a sound-reinforcement output is carried out.

[0035] On the other hand in parallel to selected output control of the above picture image data and voice data the control section 40 performs selected output control of the link information table of the program specified by a televiewer. That is the control section 40 gives directions to the depacketizing controller 39 so that the link information table of the program which the televiewer specified first may be incorporated into SRAM333. For this reason by control of the depacketizing controller 39 the link information table corresponding to a televiewer's designated program is extracted out of the bit stream outputted from the tuner 32 and it is incorporated into SRAM333. And this link information table is transmitted to the memory 43 from SRAM333 by control of the control section 40 and is stored.

[0036] The control section 40 analyzes the contents of the link information table stored in the above-mentioned memory 43 next creates the indicative data of the above-mentioned link information based on this analysis result and once writes it in Video RAM (VRAM) 44. The indicative data of the link information written in this VRAM44 is read synchronizing with the synchronized signal which is not illustrated and after being changed into an analog signal with D/A converter 45 it is supplied to the screen synthetic circuit 36. The screen synthetic circuit 36

compounds the status signal of the above-mentioned link information to the video signal outputted from D/A converter 35 according to directions of the control section 40 and is made to display it on the monitor 37.

[0037] The control section 40 has a change change control facility of the reception program based on link information. This control facility performs change of broadcasting channel frequency which receives according to this specified link information selection of an applicable program and its reproducing output control when the title of link information on display is specified with the remote control 42.

[0038] Next operation of the system constituted as mentioned above is explained. With the sending set by the side of a broadcasting station the link information table beforehand created for every program is first stored in the link information outputting part 27. The link information table corresponding to the program under broadcast is selectively read from this link information outputting part 27 and multiplex is carried out to picture image data, voice data and information data and it is transmitted to them. Read-out of the above-mentioned link information table is controlled so that the always optimal link information table is transmitted according to the change of a program and the change of the contents of the program accompanying time progress.

[0039] On the other hand in a broadcast receiving set presenting of link information and program change processing operation based on it are performed as follows. Drawing 3 is a flow chart which shows the operation procedures and activity.

[0040] When the specification or switching operation of a program a televiewer (user) expects viewing and listening in the remote control 42 is performed in Step 3, that operation information is analyzed with the microcomputer 41 and packet ID of the organization channel acquired in this analysis is stored in the memory 43. If it does so the control section 40 will give frequency selective ringing to the tuner 32 in order to receive a corresponding broadcasting signal according to packet ID of the organization channel stored in the above-mentioned memory 43. For this reason in the tuner 32 tuning is performed and receiving operation of the

broadcasting signal of the above-mentioned specification organization channel is performed henceforth.

[0041]If the receiving operation of the above-mentioned broadcasting signal is startedwhile PAT will be detected from a receiving bit stream in Step 3ba packet is extracted and it is stored in the program table memory 334. And while the above PAT is read from the program table memory 334 in Step 3cPID of this PMT is transmitted and stored in the memory 43.

[0042]Thenin Step 3dPMT is read from the memory 43and directions are given to the depacketizing controller 39 from the control section 40 in order to extract the packet corresponding to the program specified by a user according to the contents of this PMT. For this reasonthe video packet and packetized voice corresponding to the program specified by a user are extracted from a receiving bit streamand are stored in FIFO memory 331332. The information data and the link information table corresponding to a designated program are read from SRAM333and it is stored in the memory 43.

[0043]Among the above-mentioned video packeta packetized voicean information packetand a link information tablea video packet and a packetized voice are read from FIFO memory 331332and are supplied to the video decoder 341 and the audio decoder 342. And among theseas shown a video packet in Step 3fafter being decoded by the video decoder 341as shown in Step 3j it is changed into an analog signal with D/A converter 35and is supplied and displayed on the monitor 39. Drawing 5 (a) shows the case where the lesson program which shows the display example and the user showed to drawing 4 is chosen.

[0044]Simultaneouslyas shown in Step 3eafter being decoded by the audio decoder 342as the loudspeaker 38 is supplied and it is shown in Step 3i from this loudspeakerthe sound-reinforcement output of the packetized voice concerning the above-mentioned lesson program is carried out.

[0045]On the other handan information packet is read from the memory 43 in 3 g of stepsand is decoded by the control section 40. And it is judged whether the

superimposed title of the additional information by which the step 3k smell lever was decoded is carried out to a video signal. Supposing directions of the superimposed title were made by the user here After the above-mentioned additional information is written in VRAM44 in 3 m of steps it is supplied to the screen synthetic circuit 36 via D/A converter 45 it is compounded by said video signal in this screen synthetic circuit 36 and is displayed on the monitor 37.

[0046] A link information table is read from the memory 43 in Step 3 and is decoded by the control section 40 and thereby the title of the above-mentioned link information table is reproduced. It is judged in 3l. of steps whether the above-mentioned title is imposed. And when directions of imposing were made by the user after the title of the above-mentioned link information was written in VRAM44 at Step 3n The screen synthetic circuit 36 is supplied via D/A converter 45 and it is compounded by said video signal in this screen synthetic circuit 36 and is displayed on the monitor 37.

[0047] In this way the title of each program of a link destination is expressed on the monitor 37 as the gestalt on which it was imposed by the image of the lesson program. Drawing 5 (b) shows an example of the bit map data of the link information formed on VRAM44 and shows the display example at the time of compounding and carrying out the monitor display of drawing 5 (c) to the image (drawing 5 (a)) of the lesson program which described the bit map data of this link information previously. The figure shows the case where the golf program the tennis program and the TOP program are linked to the lesson program as shown in drawing 4.

[0048] Now suppose that the user operated the remote control 42 in Step 3o in this state and the tennis program was chosen. If it does so the control section 40 returns to Step 3a distinguishes the broadcasting channel frequency of the above-mentioned tennis program based on the link information table stored in the memory 43 and it will give frequency selective ringing to the tuner 32 so that it may receive the above-mentioned tennis program. For this reason in the tuner 32 tuning is performed and receiving operation of the broadcasting signal of



broadcasting channel frequency specified [ above-mentioned ] after that is performed.

[0049]and -- setting to Step 3b - Step 3n like reproducing output operation of the lesson program described previously after that -- the above -- it is reproducedrespectively and the title of the link information attached to the newly received tennis program and this program is outputted. According to the relation which drawing 6 (b) shows the display example after this program selection changeand is shown in drawing 4 as link informationthe lesson programthe tournament programthe sports programand the game show are set up.

[0050]Henceforthwhenver selected designation of the program title of a link destination on display is done by the useraccording to Step 3a - Step 3n which were described previouslythe reception change control to the program of an applicable link destination and the corresponding display action of link information are performed. Drawing 6 (c) shows the indication results at the time of making a selection change to a game show from a tennis program as the example.

[0051]Although it started from the lesson program and the program was chosen and changed in order of the tennis program and the game show in the above example of operationit is possible to return to the program before change one by one based on the link information which each program has. The control section 40 holds all the link information of the program which carried out reception reproductionand displays the history of program change on monitor display based on such link informationWhen a user does the designation input of this title currently displayed with the remote control 42it is also possible to enable it to change into a promptly corresponding program.

[0052]By the wayas aforementioned (2) - (5) described link informationwhen it constitutes the respectively following program reproduction is attained in a broadcast receiving set.

(2) When displaying a sports program like a baseball relay broadcast so that it may be shown in ' (a)for exampledrawing 7the title of the program which is

broadcasting the progress in other halls of the genre same as the link information is displayed. When a user specifies the title of the above-mentioned link information in this state the control section 40 based on the analysis result of the above-mentioned link information it receives with a baseball relay broadcast program while displaying the program which is broadcasting the progress in the hall besides the above and the same screen is halved right and left and the received image of these programs is displayed respectively as shown in drawing 7 (b). That is a multi-window display is performed.

[0053] In order to perform such a multi-window display the output rate of the picture image data of the baseball relay broadcast program acquired from the video decoder 341 and constituted on VRAM 44 and also set up the picture-image-data output rate of the program which is broadcasting the progress in the hall twice respectively it is made to synchronize with the Horizontal Synchronizing signal which does not illustrate such picture image data and what is necessary is making it just make it output respectively. Drawing 8 shows an example of the output timing of the video signal of each program at this time B gives again an additional indication of the video-signal-outputs timing of the baseball relay broadcast program which showed A from origin and also the video-signal-outputs timing of the program which is broadcasting the progress in the hall is shown respectively.

[0054] If the video-signal-outputs timing of a baseball relay broadcast program is doubled the case where the display picture of a baseball relay broadcast program looks unnatural can be considered. Therefore it is good to make it contract the vertical deflection at the time of displaying the video signal of a baseball relay broadcast program in this case. Video-signal processing for contracting this vertical deflection is also performed in the control section 40.

[0055] The program etc. which introduce a participation player other than the program which broadcasts the progress in the other halls as link information of a baseball relay broadcast program may be added. Drawing 9 (b) shows the display example of the monitor display in this case.

[0056]When the baseball relay broadcast program of the other Stadiums is included in the link information of a baseball relay broadcast program the title of the baseball relay broadcast program of a stadium besides these is displayed on monitor displays as shown in drawing 10 (a). And if a user specifies either of the baseball relay broadcast programs of the other Stadiums in this state Based on that link information instead of the baseball relay broadcast program received until now the baseball relay broadcast program of the other Stadiums is received and with the link information of the program the video signal of this program is displayed on monitor displays as shown in drawing 10 (b).

[0057]At this time it newly received and also of course it is possible to indicate the video signal of the baseball relay broadcast program of a stadium by multi-window one as it is indicated for example in drawing 10 (c) as the video signal of a baseball relay broadcast program on display.

[0058](3) When making the program which explains the contents of the program in more detail link to 'news or a documentary program' as shown for example in drawing 11 (a) the title of the program of the link destination of "being in detail about the contents" is displayed. If a user specifies the program of "being in detail about the contents" in this state as this program is newly reproduced for example it is shown in drawing 11 (b) a simultaneous display will be carried out to monitor display by a multi-window method.

[0059](4) In order to use multi-ending when making other sub programs which are carrying out simultaneous broadcasting link to 'drama program' as shown in drawing 12 (a) on monitor display the superimposed title of the title of other sub programs is carried out to the video signal of a drama program and it is displayed on it. If the sub program of the story A for which a user wishes in this state is specified a monitor display will be carried out as reception reproduction of this sub program is newly carried out instead of the program which was carrying out reception reproduction until now for example it is shown in drawing 12 (b). On the contrary when a user specifies the sub program of the story B a monitor display is carried out as reception reproduction of this sub program is newly carried out

instead of the program which was carrying out reception reproduction until now for example it is shown in drawing 12 (c).

[0060](5) When making the emergency broadcast program link about all the programs regardless of 'genre' as shown in drawing 13 (a) on monitor display a superimposed title is carried out to the video signal of the program to which the title of an emergency broadcast program is viewing and listening and it is displayed on it. Although it is also possible to always set up the link of an emergency broadcast program is set additionally by the broadcasting station side only when the necessity for emergency broadcast usually arises. In this case on monitor display only when an emergency broadcast program is set additionally to link information that title is displayed.

[0061] If a user specifies an emergency broadcast program in this state as reception reproduction of the above-mentioned emergency broadcast program is carried out in addition to the program which was carrying out reception reproduction until now for example it is shown in drawing 13 (b) a simultaneous display will be carried out to monitor display by a multi-window method. Therefore a user becomes possible [ getting to know the contents of state of emergency such as an incident and a disaster in detail ] from the contents of broadcast of this emergency broadcast program.

[0062] By this embodiment the information on other programs which are relevant for every program in the device of a broadcasting station is set up as link information as mentioned above. Multiplex [ of this link information ] is carried out to a program it is broadcast and it is [ superimposed-title- ] made to carry out the monitor display of the title of the program of that link destination to the video signal of the program under above-mentioned viewing and listening based on the link information set up about this program during the reproducing output of the program which the user specified in the device of a receiver on the other hand. And if a user specifies the title of the program of a link destination using the remote control 42 in this state in addition to the program to which it was viewing and listening until now and which replaced this designated program with the

program to which it was viewing and listening until now it will receive and will be made to carry out a reproducing output.

[0063] Therefore a user becomes possible [choosing a desired program instance based on the program title of link information on display and viewing and listening to it on it] without performing entirely operation of looking for the program of requestssuch as channel switchingto come to view and listen other programs relevant to it during viewing and listening of arbitrary programs.

[0064](A 2nd embodiment) this embodiment -- as the program of a link destination -- the program of terrestrial broadcasting and satellite broadcasting -- in additionThe information on a connectable database is added via computer networkssuch as the Internetand the user who has an accessible receiving set to a computer network enables it to acquire the information on a database based on the above-mentioned link information.

[0065]Drawing 14 is a circuit block figure showing an example of the composition of the broadcast receiving set concerning this embodiment. In the figure identical codes are given to said drawing 2 and identical partsand detailed explanation is omitted.

[0066]The modem 46 connected to an internet providerfor example via the subscriber line 47 of a public network is formed in this device. This modem 46 is connected to the control section 400 via a bus. The control section 400 performs control for accessing the database of the request on the Internet via the modem 46 based on link informationwhen a user specifies the information on the database connected to the Internet during program viewing and listening.

Drawing 15 is a flow chart which shows the control procedure and control content.

[0067]That isif a user specifies another program using the remote control 42the control section 400 will shift to Step 4b from Step 4aand it will be judged here whether the above-mentioned designated program is a database on the Internet based on link information. And if a designated program is a database on the Internetthe connection request to the Internet will be performed to an internet provider via the modem 46 at Step 4cand it will access to the database which the

user on the Internet specified further. And if information is sent from a database to this access the modem 46 will receive this information and it will write in VRAM44.

[0068]Next the control section 400 judges whether it compounds with a video signal and a monitor display is carried out in Step 4d. Supposing it points to a user compounding and displaying at this time after carrying out rarefaction processing of the background screen of a video signal which shifted to Step 4e and was sent from the Internet herein 4 g of steps multiplex [ of a video signal and the information on VRAM44 ] is carried out and it is made to supply and display on the monitor 37. When it points to a user displaying only data it shifts to Step 4f and only the data of VRAM44 is supplied to the monitor 37 and displayed here.

[0069]And if a user inputs having completed viewing and listening with the remote control 42 the control section 400 will shift to Step 4i from Step 4h and will perform cut treating to the subscriber line (telephone line) of a public network here.

[0070]The control section 400 returns to the receiving display control of the program to which the user was viewing and listening before access of the Internet based on the link information currently held at the memory 43 after the cut treating of this subscriber line.

[0071]With such a system a user becomes possible [ receiving viewing and listening to the information not only on other programs but the database on the Internet if needed ] during viewing and listening of arbitrary programs.

[0072]This invention is not limited to each above-mentioned embodiment. For example although the title of the program of a link destination is sent out from the broadcasting station side as link information and the title of the program of this link destination was displayed with the broadcast receiving set in said each embodiment The icon which expresses the title or the contents of a program of the link destination from the broadcasting station side is sent out and it may be made to display this icon with a receiving set. The broadcasting station side transmits collectively the information which specifies the display position on the

monitor display of an icon and it may be made to display an icon according to the specification information on this display position with a receiving set in that case. [0073] Since sensing offensive to the eye will also be considered for the user who does not perform a program change if link information is always displayed only when a user performs display operation it may be made to display link information. Since there is a possibility of becoming offensive to the eye when these titles or icons are displayed simultaneously when a large number [ the program of a link destination ] it divides into every [ a small number ] according to operation of a remote control and may be made to carry out a scroll display.

[0074] As a transmission medium of the program of a link destination they may be cable-broadcasting transmission lines such as not only radio broadcasting transmission lines such as terrestrial broadcasting and satellite broadcasting but a CATV system. In addition the display type and display position of link information in the composition of link information a transmission system and a receiving set About operation procedures activity etc. in the circuitry of a display type with the program of the link destination specified by the original program and user a sending set and a receiving set and a receiving set in the range which does not deviate from the gist of this invention it changes variously and can carry out.

[0075]

[Effect of the Invention] In [ as explained in full detail above carry out multiplex / of the link information which expresses with this invention the program concerned and other programs which have predetermined relevance about each of two or more programs in the transmitting side / to two or more above-mentioned programs transmit and ] a receiver When choosing and carrying out the reproducing output of the desired program out of two or more programs by which multiplex is carried out to the broadcasting signal sent from the above-mentioned transmitting side Make receiving selection of the above-mentioned link information created about the selected program concerned and a televiewer is shown When the change request of the program based on this shown link information is inputted by the televiewer he is trying to change the program which

carries out a reproducing output based on the link information under this change request and above-mentioned presentation.

[0076]thereforeeasy in the selected designation of the program in the case of trying listening other programs relevant to the program under viewing and listening according to this invention -- and it enabling it to carry out promptly and accuratelyandThe multiplex broadcast system which can aim at improvement in a user's program selection operativity by thisits broadcast sending setand a broadcast receiving set can be provided.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1]The circuit block figure showing the composition of the data multiplexing circuit of the broadcast sending set in a 1st embodiment of this invention.

[Drawing 2]The circuit block figure showing the composition of the broadcast receiving set in a 1st embodiment of this invention.

[Drawing 3]The flow chart which shows the operation procedures and activity of a broadcast receiving set which were shown in drawing 2.

[Drawing 4]The figure showing an example of the composition of link information.

[Drawing 5]The figure showing the display action of link information.

[Drawing 6]The figure showing change of the display screen for every link first-move group selection.

[Drawing 7]The figure showing an example of the display screen after presenting of link informationand link first-move group selection.

[Drawing 8]The timing diagram which uses the original display program and the program of a link destination for the explanation of operation in the case of displaying by a multi-window method.

[Drawing 9]The figure showing the example from which the display screen after



presenting of link information and link first-move group selection differs.

[Drawing 10]The figure showing the example from which the display screen after presenting of link information and link first-move group selection differs.

[Drawing 11]The figure showing the example from which presenting of link information and the program display after link first-move group selection differ.

[Drawing 12]The figure showing the example from which presenting of link information and the program display after link first-move group selection differ.

[Drawing 13]The figure showing the example from which presenting of link information and the program display after link first-move group selection differ.

[Drawing 14]The circuit block figure showing the composition of the broadcast receiving set in a 2nd embodiment of this invention.

[Drawing 15]The flow chart which shows the operation procedures and activity of a broadcast receiving set which were shown in drawing 14.

[Drawing 16]The figure showing an example of the signal format of the bit stream for broadcast and communication specified to ISO/IEC 13818-1.

[Drawing 17]The figure showing an example of the composition for generating the bit stream for broadcast at the transmitting side.

[Drawing 18]The figure showing the selection operation of the view program in a receiver.

[Description of Notations]

25 -- Packet multiplexing controller

26 -- PMT outputting part

27 -- Link information outputting part

36 -- Screen synthetic circuit

37 -- Monitor

38 -- Loudspeaker

39 -- Depacketizing controller

40400 -- Control section

41 -- Microcomputer

42 -- Remote control

43 -- Accessory memory of a control section

44 -- VRAM

46 -- Modem

47 -- Subscriber line

331332 -- FIFO memory

333 -- SRAM

334 -- Program table memory

341 -- Video decoder

342 -- Audio decoder

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